

**REMARKS**

Applicants have carefully reviewed this Application in light of the Office Action mailed May 19, 2005. Claims 1-6, 8, 15 and 25 were previously cancelled without prejudice or disclaimer. Claims 7, 9-14, 16-24 and 26-30 are pending in this Application. Claims 7, 9-14, 16-24 and 26-30 stand rejected under 35 U.S.C. §112, first paragraph and 35 U.S.C. §103. Applicants have amended Claims 9, 12, 19 and 21 to further define various features of Applicants' invention. Applicants respectfully request reconsideration and favorable action in this case.

**Objections under 35 U.S.C. § 132(a)**

The Examiner objected to the amendment filed February 9, 2005 under 35 U.S.C. 132(a) because the Examiner alleges that the amendments introduced new matter into the disclosure. Specifically, the Examiner states that the added material includes the phrases "light is transmitted . . . through the opening through the thin film and onto the wafer," as recited in Claims 7, 17 and 26, "wherein a portion of the transmitted (or projected) light is diffracted by the photomask opening and passes through the thin film at the angle of incidence," as recited in Claims 7 and 26 and "light transmitted . . . through opening in the photomask through the thin film onto the wafer . . . a portion of the transmitted light is diffracted by the photomask opening and passes through the thin film," as recited in Claim 17. To support the objection, the Examiner provides the following remarks:

The specification fails to teach that the transmitted light passes through the photomask, then through the thin film and then to the wafer, and fails to teach the light diffracted by the photomask or the projected image generated from the photomask will pass the thin film again. This is completely in contradiction to the photolithographic process. The specification explicitly teaches that the photomask is on the wafer and it is impossible for the light to pass through the photomask and then through the thin film then onto the wafer, (please see Figure 3).

(Office Action, Pages 2-3).

Applicants submit that no new matter was added in the amendments filed on February 9, 2005, that the claims are not in contradiction to the photolithographic process and that the Examiner's statement regarding the photomask being on the wafer is incorrect. First, Figure

3 illustrates a cross sectional view of a photomask assembly that includes a pellicle mounted on a surface of a photomask. (See Specification, Pages 26-27). The figure, however, does not illustrate a photomask on a wafer as suggested by the Examiner. Second, Applicants' specification teaches that the a lens is used to project an image from the photomask onto a wafer. (Specification, Pages 4-5). The specification additionally teaches that the pellicle may be placed between the photomask and the imaging lens. (Specification, Page 10). Therefore, the specification teaches that the light diffracted by the photomask can pass through the thin film, which is not in contradiction to the photolithographic process as suggested by the Examiner.

Applicants respectfully submit that all of the amendments made in the response filed on February 9, 2005 do not add new matter and are fully supported by Applicants' specification. Applicants respectfully request that the Examiner reconsider and withdraw the objections to the claims.

#### **Rejections under 35 U.S.C. § 112**

Claims 7, 9-14, 16-24, and 26-30 stand rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention.

Specifically, the Examiner bases this rejection on allegedly newly added matter in the amendments filed on February 9, 2005. As described above, no new matter has been added and the amendments are fully supported by Applicants' specification. Applicants respectfully request that the Examiner reconsider and withdraw the rejections to Claims 7, 9-14, 16-24 and 26-30.

Claims 7, 9-14, 16-24, and 26-30 additionally stand rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable on skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Specifically, the Examiner states that the phrase "the transmission of such portion of light . . . produce an *increased resolution* of the projected image on the wafer," as recited in

Claim 7 and the phrase “projection of the diffracted portion of light . . . increase the resolution of the image,” as recited in Claim 26 are not enabled by the disclosure because “[t]he resolution of a projected image therefore is implicitly defined at least in part by the size of spatial information of the photomask, but not by the projection of certain portion of the light.” (Office Action, Page 4). In an Office Action dated December 10, 2004, the Examiner stated that the phrase “the resolution of the image . . . being defined at least in part by the projected spatial information,” as recited in independent Claims 7, 17 and 26, was “confusing and indefinite since it is not clear what is this spatial information and how can the resolution be defined by the spatial information.” (Office Action, Page 4). These statements are completely inconsistent and the Examiner now uses language deleted from Applicants’ claims to reject independent Claims 7 and 26.

Additionally, Claims 7 and 26 as previously amended in the response filed on February 9, 2005 are supported by Applicants’ specification. Specifically, the specification states that off-axis light includes higher order components that contain spatial information and by transmitting this off-axis light through the thin film and onto a wafer, a high resolution image may be projected onto the wafer. (Specification, Pages 14-15). Applicants, therefore, submit that independent Claims 7 and 26 meet the requirements of section 112, first paragraph.

The Examiner also rejected Claims 7, 17 and 26 under 35 U.S.C. § 112, first paragraph stating that “the phrase ‘light transmitted . . . through opening in the photomask through the thin film onto the wafer . . . a portion of the transmitted light is diffracted by the photomask opening and passes through the thin film’ . . . is completely wrong. . . . The light diffracted by the photomask will not pass through the thin film again rather the diffracted light will proceed to the wafer.” (Office Action, Page 4). As stated above, the pellicle may be located between the photomask and the imaging lens used to project an image on the wafer. (Specification, Page 10). Therefore, the diffracted light can pass through the thin film and the Examiner’s assertion is completely wrong.

Finally, the Examiner rejected Claim 17 under 35 U.S.C. § 112, first paragraph because “[t]he specification only enables the off-axis light at certain degrees of incidence to have transmission approximates 99% of the light but not to all of the off-axis lights or not to

any off-axis light at any incident angle.” (Office Action, Page 4). Claim 17 recites the limitation of an “amorphous fluoropolymer thin film operable to transmit approximately ninety-nine percent (99%) of off-axis light at a particular wavelength.” The claim does not recite transmission of all off-axis light at any incident angle, rather the claim recites transmission of a significant percentage of off-axis light at a certain wavelength. Additionally, the claim is supported by the specification. (See Specification, Pages 14-15 and Figure 5). Applicants, therefore, submit that independent Claim 17 meet the requirements of section 112, first paragraph.

Because independent Claims 7, 17 and 26 meet the requirements of section 112, first paragraph, Applicants respectfully request that the Examiner reconsider and withdraw the rejections to Claims 7-14, 16-24 and 26-30.

#### **Claim Objections**

Claims 9, 12, 19, 21 and 29 were objected to by the Examiner because the phrase “the thin film including an *associated* peak in transmission for normal incidence light” recited in Claims 9, 12, 19, 21 and 29 was incorrect and confusing.

To further advance prosecution of this Application, Applicants have amended Claims 9, 12, 19, 21 and 29 to overcome these objections. Applicants respectfully request reconsideration and withdrawal of the objections.

#### **Rejections under 35 U.S.C. § 103**

Claims 7-14, 16-24, and 26-30 stand rejected by the Examiner under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,742,386 issued to Noriyuki Nose et al. (“*Nose*”) in view of U.S. Patent No. 4,657,805 issued to Yasunori Fukumitsu et al. (“*Fukumitsu*”).

*Nose* discloses an apparatus for detecting foreign matter on a substrate. The substrate may be a pellicle formed of nitrocellulose. (Col. 1, Lines 44-47). The apparatus monitors the transmittance or the reflectivity of the pellicle and corrects the amount of light projected onto a surface based on the monitored value. (Col. 2, Lines 47-53). In particular, as shown in Figure 1, *Nose* discloses a system for detecting foreign matter a substrate by measuring

scattered light caused by such foreign matter along with light that is *reflected off of a pellicle* located over the substrate. (Fig. 1; Col. 4, Line 22 to Col. 5, Line 49). Corrective measures are performed by varying the intensity of the light beam. (Col. 5, Lines 38-39).

*Fukumitsu* discloses a dust cover comprising a film having a layer of a specific fluoropolymer.

Claim 7 recites a pellicle comprising a "thin film formed to cooperate with a photomask including an opening such that when light is transmitted at the particular wavelength through the opening in the photomask, through the thin film and onto the wafer to project an image of the photomask opening onto the wafer, wherein a portion of the transmitted light is diffracted by the photomask opening and passes through the thin film at the angle of incidence greater than zero, the transmission of such portion of light passing through the thin film at the angle of incidence greater than zero being maximized due to the optical thickness of the thin film produces an increased resolution of the projected image on the wafer."

Claim 17 recites a photolithography system comprising "an amorphous fluoropolymer thin film operable to transmit approximately ninety-nine percent (99%) of off-axis light at a particular wavelength such that during the photolithographic process in which light is transmitted at the particular wavelength through the opening in the photomask, through the thin film and onto the wafer to project an image of the photomask opening onto the wafer, wherein a portion of the transmitted light is diffracted by the photomask opening and passes through the thin film as off-axis light, the approximate 99% transmission of such off-axis light produces an increased resolution of the image of the opening projected onto the wafer."

Claim 26 recites a method for performing photolithography comprising the step of "projecting the radiant energy through the opening in the photomask, through the thin film and onto a wafer to form an image of the photomask opening on the wafer, wherein a portion of the projected light is diffracted by the photomask opening and passes through the thin film at the angle of incidence greater than zero for which the transmission of light through the film is substantially maximized, such that the thin film substantially maximizes projection of the diffracted portion of light onto the wafer due to the optical thickness of the thin film in order to increase the resolution of the image of the photomask opening projected on the wafer."

Applicants respectfully submit that the cited references fail to disclose every element of Applicants' invention as amended. Further, there is no motivation, teaching, or suggestion to combine *Nose* and *Fukumitsu*. *Nose* and *Fukumitsu*, alone or in combination, fail to teach at least a "thin film formed to cooperate with a photomask including an opening such that when light is transmitted at the particular wavelength through the opening in the photomask, through the thin film and onto the wafer to project an image of the photomask opening onto the wafer, wherein a portion of the transmitted light is diffracted by the photomask opening and passes through the thin film at the angle of incidence greater than zero, the transmission of such portion of light passing through the thin film at the angle of incidence greater than zero being maximized due to the optical thickness of the thin film produces an increased resolution of the projected image on the wafer," as recited by amended Claim 7. Additionally, *Nose* or *Fukumitsu* fail to teach a photolithography system including "an amorphous fluoropolymer thin film operable to transmit approximately ninety-nine percent (99%) of off-axis light at a particular wavelength such that during the photolithographic process in which light is transmitted at the particular wavelength through the opening in the photomask, through the thin film and onto the wafer to project an image of the photomask opening onto the wafer, wherein a portion of the transmitted light is diffracted by the photomask opening and passes through the thin film as off-axis light, the approximate 99% transmission of such off-axis light produces an increased resolution of the image of the opening projected onto the wafer," as recited by amended Claim 17. Further, *Nose* or *Fukumitsu* fail to teach or suggest "projecting the radiant energy through the opening in the photomask, through the thin film and onto a wafer to form an image of the photomask opening on the wafer, wherein a portion of the projected light is diffracted by the photomask opening and passes through the thin film at the angle of incidence greater than zero for which the transmission of light through the film is substantially maximized, such that the thin film substantially maximizes projection of the diffracted portion of light onto the wafer due to the optical thickness of the thin film in order to increase the resolution of the image of the photomask opening projected on the wafer," as recited by amended Claim 26.

The Examiner states that "[i]t is . . . implicitly true or obvious modification to one skilled in the art to use light incident at these off-axis incident angles on the thin film pellicle

and the light is transmitted by the thin film to the photomask and to expose and transfer the IC pattern on the photomask to the wafer for the benefit of maximizing the intensity of the exposure light to efficiently form the pattern on the wafer.” (Office Action, Page 8). The Examiner’s rejection, however, fails for at least the following reasons. First, the Examiner’s statement with respect to the thin film transmitted off-axis light to the photomask is incorrect. As stated above and specifically recited in Claims 7, 17 and 26, the light is diffracted by an opening in the photomask and the diffracted light passes through the thin film because the thin film is designed to maximize transmission of off-axis (e.g., diffracted) light. Second, *Nose* and *Fukumitsu* do not disclose the recited elements as necessarily present. *Nose* and *Fukumitsu* fail to teach or suggest, either explicitly or implicitly, that a thin film optimized for transmission of off-axis light produces an increased resolution of a projected image on a wafer. In contrast, *Nose* merely discloses that transmittance changes with the incident angle and the pellicle thickness for S-polarized light (Col. 6, Lines 35-37) but is silent on how a pellicle is optimized to transmit off-axis light in order to increase resolution of a projected image. Only by reading Applicants’ Specification can a person of skill in the art determine how transmission of off-axis light through a thin film is maximized in order to increase the resolution of an image projected on a wafer. (Specification, Pages 7-8 and Pages 14-15). It is improper to use Applicants’ Specification as evidence that a claim element is well known in the art. The cited references, therefore, fail to disclose the recited limitations and cannot render obvious Claims 7, 17 and 26.

Given that Claims 9-14 and 16 depend from Claim 7, Claims 18-24 depend from Claim 17, and Claims 27-30 depend from Claim 26, Applicants respectfully submit that Claims 9-14, 16, 18-24 and 27-30 are allowable. As such, Applicants respectfully request that the Examiner withdraw the rejections and allow Claims 7, 9-14, 16-24 and 26-30.

**CONCLUSION**

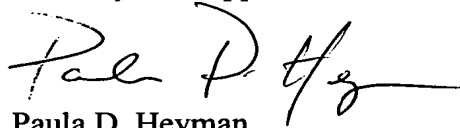
Applicants appreciate the Examiner's careful review of the application. Applicants have now made an earnest effort to place this case in condition for allowance in light of the amendments and remarks set forth above. For the foregoing reasons, Applicants respectfully request reconsideration of the rejections and full allowance of Claims 7, 9-14, 16-24 and 26-30.

Applicants enclose a check in the amount of \$450 for the 2 month extension fee. Applicants believe no additional fees are due at this time, however, the Commissioner is hereby authorized to charge any fees to Deposit Account No. 50-2148 of Baker Botts L.L.P. in order to effectuate this filing.

If there are any matters concerning this application that may be cleared up in a telephone conversation, please contact Applicants' attorney at 512.322.2581.

Respectfully submitted,

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